Research Proposal

Rapid Bioassessment

Problem Title. Can the aquatic toxicity or ecologic effects of untreated highway runoff ("hot spots") be identified through rapid biological assessment methods using highway/receiving water/land use characteristics rather than through direct chemistry testing?

Problem Statement. Regulators in Washington State generally assume that all highway runoff is toxic, although historic research has shown that, in general, highway runoff does not present direct acute toxicity, as determined from field-based bioassays or bioassessments (FHWA open file report 98-630, *An Overview of Factors Involved in Evaluating the Geochemical Effects of Highway Runoff on the Environment*). Stormwater flow events are intermittent, and runoff pollutant levels tend to be high at the leading edges of storms and storm seasons, but lower later on. As a result, prolonged levels of exposure are not expected, so prolonged-exposure effects are also not expected. On the federal level, NCHRP project 25-20(01) "*Evaluation of Best Management Practices for Highway Runoff Control*", funded for fiscal year 2003 by AASHTO, included this element as part of their scope of work.

It would be useful to be able to delineate which stormwater outfalls would be the most appropriate candidates for "enhanced" treatment for dissolved metals or retrofits to maintain aquatic health without having to conduct extensive field testing and/or elaborate modeling.

Literature Search. Two relevant studies are listed above. Additionally, the Transportation Research Board has identified the topic of highway runoff toxicity, its bioavailability, and suitable rapid assessment methods as a priority for funding for '02-'07 planning period.

Research Methods. This is a meta-analysis study – a synthesis of available literature about the topic. Continue searches of peer-reviewed and "grey" literature for related studies. It may be an appropriate topic for development of a "white paper" that summarizes the current state of research.

Partnering Opportunities. Many DOTs, particularly those in states with rigorous NPDES requirements, would be interested in rapid assessment procedures so that they can justify stormwater management decisions.

Estimate of Costs and Research Duration. Estimated costs not developed, but expected to be greater than $50,000 but not greater than $100,000.

Urgency, Payoff Potential, and Implementation. Payoff potential is substantial, as research results could lead to a rapid assessment method that could reduce monitoring costs.

Research Proposer

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Research Monitor (to be assigned, as needed, by the research program administrator)

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